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Next Steps in Business Conversion: Supporting Innovation and Entrepreneurship

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Change in the economy: Defense conversion and Maine

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Defense conversion is a major issue confronting Maine and other states that are threatened with the loss of major military and civilian defense facilities. The closing of Loring AFB this year has made real to most Maine citizens the rapidly changing nature of our defense infrastructure. As the anxiety increases about the future of remaining defense facilities, both the public and private sectors are working to develop meaningful conversion programs and policies. The latter was the focus of a statewide conference on defense conversion -- "From Defense to Offense" -- held last June in Portland. The following five articles, some of which are based on presentations made at the Maine Science and Technology Foundation-sponsored conference, focus on the defense conversion issue. They include national, regional and state perspectives on the likely economic impacts of defense policy changes, the need for greater federal support for small and medium defense conversion firms, the politics of Maine's defense conversion efforts, and an interview with the leaders of the Maine Economic Conversion Project. Additionally, Maine's state economist examines the nature and extent of the state's defense dependency and its implications for future economic growth. (See News and Commentary section.) 1This article is drawn from a special report of the same title published by BENS in November 1993.

Next steps in business conversion: Supporting innovation and entrepreneurship entrepreneurship[1]

by Eric R. Pages

Although important progress has been made in assisting defense firms in their conversion efforts, the Clinton administration and the Congress must look at several new initiatives that will improve access to capital and provide other needed services to small and medium-sized defense firms, says the author of the following article. Erik R. Pages, director of the Business Executives for National Security (BENS) Defense Transition Project, outlines a number of new initiatives that will help strengthen existing conversion programs, including the creation of a defense conversion fund to make more working capital available for small and medium-sized defense firms.

Introduction

For many years, Washington resisted programs that encouraged defense companies to pursue business in civilian markets. The Clinton administration initiated a change in this legacy when it supported the creation of the Technology Reinvestment Project (TRP) and a number of other programs to support defense conversion. Missing from this laudable effort have been programs that assist defense firms and start-up ventures which require financing to commercialize defense technologies.

This study analyzes the causes of the credit crunch and its particularly severe effects on small defense and high-technology firms. It next describes existing federal programs and points to several state and local business assistance programs that might offer models for new federal efforts. Finally, it offers a range of suggestions for enhancing small business' access to patient working capital.

Background

With defense budgets in decline, U.S. businesses can no longer remain dependent on defense contracts for the bulk of their revenues. After many years of postponing change, American defense contractors have begun to respond to these wrenching dislocations. Businesses across the country are now turning their attention to defense conversion and are searching for ways to succeed in commercial markets.

These moves into commercial sectors make good business sense. Simply put, there are too many defense firms chasing too few defense dollars. Since 1985 fiscal year (FY) -- the height of the Reagan defense buildup -- the U.S. defense budget has been reduced by 32 percent and will decline an additional 25 percent by FY1997. Procurement accounts have been reduced even more rapidly. Since 1990, procurement spending has declined by roughly 15 percent every year. Since 1985, the total procurement budget has been cut by 64 percent (Koziak 1993). In contrast to defense spending declines after the Korean and Vietnam conflicts, today's downturn is not cyclical. With few major security threats on the horizon, the short-term trend for defense spending is a continuing steady decline.

Past business diversification efforts have achieved mixed levels of success. Contrary to the claims of Martin Marietta Chairman Norman Augustine and other defense industry executives who claim that "the record of conversion is unblemished by success," some defense firms have succeeded in entering commercial markets. But making the transition is difficult. In fact, entering new markets has proved difficult for both military and commercial firms. Studies of efforts by commercial firms entering new markets found that only 20 percent of diversifying firms survived for more than ten years.

The spreading impact of defense cuts led to a growing interest in government programs to ease the transition from defense to commercial work. As is so often the case, state and local governments have taken the lead. Yet, few of these initial efforts were designed to support defense businesses alone. In most instances, support for defense firms was included in economic development programs first created in the 1980s to help revitalize manufacturing in the Northeast and Midwest regions. The paradigms for these programs are Pennsylvania's Ben Franklin Technology Partnerships and the variety of programs developed in Ohio which support technology transfer and business development activities.

Building on these models, state and local governments began creating a package of assistance programs for defense-dependent businesses that provided services such as retraining, marketing assistance, and small business loans. St. Louis' Economic Adjustment and Diversification Program is a national model for such efforts. Created in 1990 to help companies and workers respond to lay-offs at McDonnell Douglas and its subcontractors, the St. Louis program has proven quite effective in supporting new companies and retraining workers and management.

The program provides entrepreneurial training to laid-off defense personnel, and, most importantly, personnel at risk of being laid-off. St. Louis also operates a small business incubator on space donated by McDonnell Douglas. This incubator has contributed to the establishment of several successful companies in the region.

Current federal programs

While the states and localities continued these low-level efforts, Washington largely maintained a "hands-off" attitude toward promoting defense conversion. Indeed, the federal government did little to develop expertise in defense conversion -- the only agency responsible for this area was the Pentagon's Office of Economic Adjustment (OEA), which provides assistance to communities affected by military base closures.

As defense budgets declined, pressures to develop federal conversion programs intensified. Given Washington's limited expertise, the Congress was forced to create new programs to support industry diversification. Initial efforts began in 1991. In 1992, Congress passed the Defense Conversion, Reinvestment, and Transition Assistance Act of 1992. Passed over the Bush administration's objections, this bill created a series of new conversion programs and significantly increased funding for existing projects.

In contrast, the Clinton administration embraced the Congress' efforts and created a comprehensive conversion program of its own. Announced in March 1993, it included new programs to assist workers and aid communities affected by the closure of military bases. Also included was an innovative approach to supporting dual-use R&D -- the Technology Reinvestment Project (TRP).

The TRP contains eight programs created by Congress in 1992. For FY1993, the TRP was funded at approximately $471 million; expected funding for FY1994 is $575 million. The TRP is administered by an interagency group known as the Defense Technology Conversion Council, which consists of the Departments of Defense, Commerce, Energy, Transportation, the National Science Foundation, and the National Aeronautics and Space Administration. Although the program is jointly administered, primary management responsibility rests with the Pentagon's Advanced Research Projects Agency (ARPA).

The TRP represents a revolution in U.S. defense industrial base policy. Unlike past defense R&D programs, the TRP aims to encourage research into commercial or dual-use products *(i.e.*, items that can be utilized for both military and civilian purposes). For the first time, Washington has supported efforts by defense firms to diversify into new markets.

While individual TRP programs differ, they share two characteristics. First, they encourage coordination and collaboration between business, government, academia, and non-profit groups. Second, nearly all of the programs require matching funds from the private sector. In most cases, award recipients must provide at least 51 percent of a project's funds. Sematech and other federally sponsored consortia require similar cost-sharing criteria.

In addition to being innovative, the TRP has also been popular. Initial regional briefings were heavily attended, prompting many observers to raise fears that TRP managers would be

swamped with applications. In late July, the TRP received roughly 2,800 applications, requesting a staggering total of more than $9 billion in grants. On October 22, 1993, the President announced the first round of TRP selections, funding 41 projects involving 272 industrial and other organizations.

While most observers acknowledge that the TRP is well-intentioned and well-managed, it does not address many critical components of the conversion puzzle. First, insufficient funding lessens the program's potential impact, as nearly $7.5 billion worth of proposals will likely go unfunded. However, given the current budget climate in Washington, one should not expect major increases in funding levels over the near term.

Second, as currently structured, small and medium-sized firms -- the purported focus of the TRP -- have faced difficulties in competing for support. Stiff competition has played some role in dissuading smaller businesses from competing, but the most important factor has been the TRP's requirements for matching funds. Already buffeted by an economy-wide credit crunch, small businesses have faced great difficulties in obtaining funds to meet the TRP's matching requirements. The FY1994 Defense Authorization bill urges the administration to offer more flexible matching arrangements for smaller firms.

Third, the bulk of TRP funding (approximately $262 million) focuses on technology development. Generally speaking, technology development funds provide R&D support and are managed in a manner similar to other ARPA projects. Primarily, this means providing seed money to cultivate new dual-use technologies or configure military technologies for commercial needs.

However, few small and medium-sized firms need more R&D funding, a fact borne out by state-level surveys from across the nation. The results of these surveys are nearly unanimous and were further confirmed in interviews conducted for this study. Above all else, contractors expressed interest in government assistance with marketing, financing and export promotion. The TRP supplies none of these services.

Finally, the TRP focuses almost exclusively on aiding existing firms. While this focus is unavoidable, it neglects an important part of the conversion equation: Assisting start-up firms and new entrepreneurs leaving the defense sector. Politicians and analysts frequently note that some of America's most advanced technologies and skilled personnel are utilized in defense production. What they fail to note is that these resources may offer the potential to create the twenty-first century successors to Silicon Valley and Massachusetts' Route 128 corridor. Washington must do more to support small business incubators and other programs that spur entrepreneurship.

Different conversion strategies

The TRP's lack of support for smaller entrepreneurial firms points to a fundamental weakness in many conversion programs across the country. Few of these projects recognize the potential for two separate types of conversion strategies. Internal conversion refers to efforts by defense companies to transform themselves to compete in commercial markets. It involves the transition of the business' existing workforce, equipment, and facilities. In contrast, external conversion

refers to the broader economy-wide transition of workers, technologies, and facilities released by military-oriented firms to reemployment in the civilian sector.

Because many defense firms are poorly equipped for the civilian marketplace, internal conversion is quite difficult to achieve. Defense firms have a corporate culture unlike that of their commercial counterparts. Because they traditionally sell to one customer --the U.S. Government -- they lack commercial marketing skills and expertise. Moreover, military customers often demand products manufactured in small numbers that meet stringent technical standards. In many cases, this requires hand-tooling rather than the automated production that characterizes non-defense manufacturing. All of these distinctions have produced a unique corporate culture which complicates defense diversification efforts.

While difficult, internal conversion is not impossible. Small and medium-sized businesses have been most successful in entering commercial markets. These companies have capitalized on a number of special advantages that ease the path to diversification. In contrast to the larger prime contractors, small firms tend to lack large internal bureaucracies, making them more flexible to enter new markets. Moreover, many smaller firms already do business with both defense and commercial suppliers. Thus, they already understand the commercial marketplace. Finally, and most importantly, smaller companies tend to have a strong commitment to diversification. Larger contractors can downsize and maintain smaller but still significant market shares. For small firms, downsizing often means closure. These pressures inevitably increase management's commitment to conversion. BENS' research has found that management commitment to diversification is the most critical factor to success. It does not guarantee success, but its absence does guarantee failure.

Successful firms have determined their core competencies, and sought to exploit these competencies in new markets. For example, New Jersey's Base 10 Systems utilized its core skills in encryption technology to develop medical software that can be used to predict a person's proclivity to certain diseases (Gnoffo 1993). Similarly, Camarillo, California-based California Ampifier has enjoyed a 3-year sales increase of over 300 percent by utilizing core skills in defense radar detection to manufacture amplifiers for home satellite television dishes (Miller 1993).

As these examples indicate, internal conversion involves utilizing technologies previously developed for defense and "converting" them to civilian use. In effect, this is the classic "dual-use" strategy. This conversion strategy is the most common approach utilized by contractors; it is also the only strategy supported directly by federal conversion programs like the TRP.

Existing efforts to support internal conversion obscure the promise of a second approach: external conversion. Although external conversion is an economy wide process, this study limits its focus to the possibility of utilizing defense technologies and skilled defense personnel to develop new businesses and create additional growth opportunities in the future.

External conversion involves efforts to promote technological innovation and spur entrepreneurship. It can take several forms, including the creation of new start-up companies and

support for new firms that “spin-out” of larger defense firms and commercialize defense-related research.

Although state and local programs have made important contributions in this area, Washington has done little to support external conversion efforts. This is unfortunate, because this conversion strategy offers great promise. No matter how successful, internal conversion efforts rarely preserve every job previously devoted to defense production. Indeed, internal conversion must often be viewed as a stop-gap effort to maintain a viable company and retain as many jobs as possible. External conversion, in contrast, offers the potential for job creation and productive re-employment of displaced defense workers, management, and capital resources.

In addition, support for external conversion can offer many benefits to the economy at large. Small, innovative firms have traditionally served as the drivers of technological advancement in the U.S. defense firms and their research facilities now undertake state-of-art research in a number of areas. Encouraging entrepreneurs to commercialize defense research could not only create new jobs but also help spur the nation’s technological growth into the twenty-first century.

Supporting spin-off: What is needed?
Our interviews and previous research indicate that, in high technology sectors, the success of start-up or spin-off firms depends on three factors:

- Technology that meets market need
- Effective management with market savvy
- Stable sources of capital

Cutting-edge technologies do not, by themselves, guarantee commercial success. Less exotic technologies are often easier to adapt to products with high market potential. For many firms in their infancy, it may make sense to postpone manufacturing and marketing products utilizing their most innovative technologies. Successful start-ups often focus on low-profile products that help generate cash-flow, which in turn helps fund development of other products.

Determining a technology’s market potential is an extremely complicated task. In fact, it might be best portrayed as an art rather than a science. This process is especially difficult for defense firms who traditionally market to only one customer -- the U.S. Department of Defense.

It is here that market savvy comes into play. Market savvy seems to rely on equal measures of innate entrepreneurial sense and past professional experience. However, studies of successful start-up companies indicate that the latter may be more important. One recent study found that CEOs of high-growth start-ups averaged ten years experience in the industries in which they started their companies. In contrast, the majority of CEOs of no-growth or low-growth start-ups had no experience or had spent only a few years learning their industries from the inside (Brokaw 1993).

These data offer a sobering reminder to defense industry executives trying to create new commercial companies. Thus, in many cases, start-ups should stick close to home, developing dual-use technologies prior to developing purely commercial products. Moreover, research also

indicates that the most successful start-ups were founded by teams. As Inc. magazine put it: “If You Don’t Have Experience Buy It.” By linking with others, defense personnel can tap the expertise of managers with backgrounds in commercial markets.

Reliable sources of capital are the final ingredient for successful start-ups. Although individual company demands for capital are often quite limited, aggregate demand for start-up capital has remained intense in recent years. Unfortunately, sources of capital have declined precipitously in recent years. This credit crunch has impacted all types of businesses, but it is especially severe on defense firms trying to enter commercial markets. Banks have been reluctant to loan to contractors for several reasons. First, they remain skeptical about the prospects for defense conversion. This process is inherently high-risk, and discourages bank lending. Second, bankers often appear equally skeptical about the market savvy of defense industry managers. Finally, even when a defense firm shows some commercial success, they frequently have difficulty obtaining financing. This has been especially true in commercial aerospace, where bankers fear future market downturns. In some cases, defense firms have won commercial contracts, but were unable to secure financing (Marks 1993). Without financing in place, they have been forced to forego the contract.

This poses a real dilemma for smaller defense contractors. On the one hand, their old markets are slowly but surely disappearing. At the same time, even when they succeed in retooling, they cannot get financing to enter new markets. When working in the defense world, these firms survived on Pentagon progress payments. In the commercial world, progress payments do not exist. The company is paid after the contract is completed. Thus, the demand for working capital expands as companies shift more and more of their business into commercial markets.

While banks have grown unwilling to make loans, other sources of capital have also dried up. During the 1980s, private venture capitalists helped fund such industry giants as Sun Microsystems and Microsoft. Unfortunately, many of these funding sources no longer exist, as classic venture capital investment had almost disappeared by 1990. While American venture capital remains a vibrant industry, venture firms have begun to focus their attention on lower-risk, later-stage investments. Some figures developed by Venture Economics illustrate this change. Between 1987 and 1992, the value of venture capital investments in start-up companies declined by roughly 65 percent. Thus, one of the primary engines of past economic growth has nearly disappeared at the time when patient start-up capital is in great demand. As a result, start-up companies have been unable to take ideas from the drawing board to the marketplace.

Most analysts agree on a menu for start-up success that includes stable financing, management skill, and innovative technology. Unfortunately, they also agree that many of these ingredients do not exist in the defense sector. Former defense personnel can rely on unique strengths in only one area -- technology. American companies, and especially firms in the defense sector, enjoy access to technologies that are second to none. Their primary challenge is to commercialize this technology. This problem is not confined to defense firms. In general, American industry and research institutions have excelled at basic research, but have lagged behind foreign firms in their ability to turn this research into commercial products.

Given the needs of defense firms and the inherent technological advantages they enjoy, one might expect government programs to focus on providing management training and improving access to capital. Ironically, government programs have instead focused on improving the technological base of defense firms through additional support for R&D. The major obstacles facing new companies have not been addressed.

Supporting spin-off: A workable blueprint

If the Clinton administration hopes to further promote defense conversion, it must reorient its priorities and tackle these other critical problems. Instead of continuing to fund dual-use research through traditional mechanisms, it must also begin to nurture a broader technological infrastructure that promotes innovation and entrepreneurship. An effective technological infrastructure includes traditional factors like transportation and communications facilities, but it also entails new factors such as technology talent, access to capital, and close cooperation between government and business. Supporting this infrastructure will not only promote defense conversion, it will also support efforts to promote technological development across the board.

These new initiatives do not require major infusions of new funding or the creation of new organizations. Fortunately, many outstanding models, such as the St. Louis project, already exist at the state and local level. These programs provide start-ups and small businesses with a wide range of services that can help ease the path to success. Washington should support and emulate these efforts.

Programs don't have to be driven and directed by government bureaucrats. Indeed, that approach is doomed to failure. If government efforts are to succeed, they must be based on existing market needs and demand. Government cannot do this alone. However, it can play a useful role if conversion support programs 0are based on a cooperative relationship with the private sector.

These partnerships can take many forms. Some have been created by state governments. Pennsylvania has been a leader in national efforts to promote entrepreneurship through its nine technology transfer and industrial extension projects. Philadelphia's Ben Franklin Technology Center of Southeastern Pennsylvania has been particularly effective, providing seed capital for two-thirds of the 25 leading growth-oriented companies in the Philadelphia area. The Center is funded through a combination of state funding, grants, and in-kind contributions from supported business and provides a range of services for start-up firms. These include support in licensing new technologies, a start-up capital fund for new entrepreneurs, and range of databases that provide vital information to businesses.

Universities, often in cooperation with government, have also created effective programs to support new business development. Using its state of the art facilities and high-quality faculty, the Massachusetts Institute of Technology has been a national leader in supporting entrepreneurial firms. MIT's technology transfer efforts have helped create more than sixty companies since 1984. In addition, MIT continues to negotiate approximately eighty new licenses for technology each year (Preston 1993).

The MIT effort works primarily through the transfer of technologies first developed by university researchers. Other universities have established more "hands-on" business

development programs. For example, the University of Texas-Arlington provides effective manufacturing extension services through its Automation and Robotics Research Institute (ARRI). ARRI has played an important role in supporting several defense spin-off companies in the Dallas-Fort Worth area. Similarly, the University of Colorado at Colorado Springs has recently created an ambitious program to support new business utilizing defense technologies from area firms.

Public-private partnerships are not the only possible model. In a number of cases, companies themselves have created effective programs on their own. Grumman Corporation has recently created a Corporate Licensing Office as well as Grumman Ventures, a venture capital subsidiary that makes equity investments in emerging technologies. The Licensing Office licenses patents, copyrights, and know-how which Grumman does not seek to commercialize. Grumman Ventures invests in firms with innovative technologies with the potential for a strategic fit with existing Grumman initiatives. Both of these programs present an excellent model for spurring the development of technologies in entrepreneurial startup firms.

The Microelectronics and Computer Technology Corporation (MCC) recently create its own venture capital arm, MCC Ventures, Inc., in 1992. MCC Ventures provides a wide range of support, including financial and management assistance, international bench marking, and commercial market development. MCC has already succeeded in supporting several start-ups and recently won a contract to support start-up companies commercializing research from Los Alamos National Laboratories.

Keys to success

Existing efforts provide a variety of services, maintain different organizational structures, and support different types of companies and industrial sectors. Yet, despite their differences, successful programs evince several shared characteristics that are critical to success. Five factors have been especially important:

- Provide hands-on help.
- Provide a wide range of services.
- Focus on market development.
- Offer management training.
- Focus on affordable technology.

Existing programs are normally small and under funded. For this reason, they have generally been unable to provide businesses with state of the art facilities or technologies. They have instead emphasized providing more mundane, but essential, services such as marketing surveys, business planning advice, and entrepreneurial training.

These efforts are driven by two primary thrusts: Improving the quality of management and ensuring that a firm’s market goals are realistic and achievable. In addition, successful programs traditionally provide “one-stop shopping” for business development. In this sense, the programs are user-friendly. To its credit, the Clinton administration has recognized the importance of improving existing services in many of its own conversion programs.

How can Washington help?
Based on the lessons from these successful regional, state, and local initiatives, the Clinton Administration should institute several changes to its conversion initiatives. First, it should expand support for small business incubator and management training services. These programs, such as the Ben Franklin Centers and Connecticut's Seatech Center, work well because they offer an array of hands-on services under one roof. Although the services provided by these centers vary considerably, they typically include financing, provision of office space, legal guidance, bookkeeping assistance, networking opportunities with other firms, and export assistance.

Some of these services can be provided through the seven manufacturing extension centers now managed by the National Institute of Standards and Technology (NIST). President Clinton plans to increase the number of these centers to 35. In addition, the NIST Centers will enjoy a 66 percent boost in their budgets for FY1994.

While the NIST centers can offer useful assistance in supporting manufacturing improvements, they cannot offer many of the hands-on services provided by state and local business assistance centers. Nor should we expect the NIST centers to offer this service; they are appropriately limiting their efforts to supporting technology transfer and manufacturing improvements.

While some states, such as Connecticut and New York, have set up effective business development programs, others have lagged behind. And few states offer programs targeted to the special needs of defense contractors. Unfortunately, many areas of greatest need, such as Southern California, lack well-funded programs to help develop new businesses. To help other states emulate the example of effective state programs, the Clinton administration should consider creating a new Business Development Program category under the TRP.

The Business Development Program would work in similar manner to the TRP's other technology deployment programs. Universities, regional bodies, and state and local governments would be eligible to apply for federal funding to support the creation of new business development centers or expansion of existing programs to support the diversification of small businesses and the development of new start-up firms. As with other TRP programs, Business Development funds would be competitively awarded and based on a fifty percent cost sharing by the applicant.

Second, the administration must continue to expand its export promotion activities. The President's National Export Strategy, announced on September 29, 1993, takes a step in the right direction by eliminating outdated export controls and expanding Washington's export promotion activities. Companies will face many fewer obstacles in obtaining government assistance, as the new strategy is based on "one-stop shopping" for export promotion aid. Finally, and most importantly, the Commerce Department will begin shifting funds to provide greater support for manufacturing exports. Until quite recently, nearly 80 percent of U.S. export promotion funds supported agriculture, which accounted for only 10 percent of all U.S. exports (Bradsher 1993).

One of the more promising components of the President's plan is the proposed creation of at least four export assistance offices outside of Washington, which will focus on supporting

smaller exporters. However, budget constraints are likely to restrict the expansion of this program. For this reason, the administration must also continue to support state and local export promotion activities. In addition to being more numerous, these programs are also likely to be more effective. Many smaller companies seek assistance in market development at home before pursuing export opportunities. Business development centers can provide an effective bridge between market development at home and the promotion of sales overseas.

Third, the administration should examine the use of tax incentives to encourage private initiatives which spur entrepreneurship. As noted above, Grumman, TRW, and other prime defense contractors have established divisions which transfer technology or intellectual property to start-up "spin-out" enterprises. In other cases, contractors have provided space or equipment to these enterprises. For example, Lockheed has donated plant space to CALSTART, an innovative Los Angeles-based consortium developing advanced transportation systems and technologies. Tax credits could facilitate a major expansion of these beneficial activities.

Finally, the administration must take action to enhance the availability of capital for defense diversification projects. Lack of financing has been an impediment to defense firms as they seek to enter commercial markets. As we saw earlier, this financing dilemma has a variety of causes, including an economy-wide credit crunch, declines in venture capital support for start-ups, and investors' general pessimism regarding the prospects for defense conversion. Faced with these obstacles, some observers have suggested that Washington provide direct financing for conversion projects. Another proposal recently considered by Congress called for creation of a small business loan program administered under the TRP. The FY1994 Defense Authorization bill also includes limited funding for small-business loans.

These well-intentioned efforts are unlikely to be effective. With respect to the notion of a TRP loan guarantee program, ARPA's lack of experience in this area is particularly worrisome. ARPA has proven uncommonly effective in supporting innovative R&D; it has no proven track record in making loans to businesses. In general, Washington has a poor record in targeting investments to individual companies.

A far more effective approach would be to create a privately-run Fund for Defense Conversion (FDC), which would "privatize" parts of the TRP. The FDC would be organized through support for individual venture capital outfits with the U.S. government as the initial investor. The FDC would extend capital on favorable terms -- through low-interest, long-term loans or loan guarantees -- to private firms seeking to convert all or part of their defense activity to non-defense applications. Private firms would be responsible for determining the potential activities to be funded, initiating the application, and, if it is approved, investing their own stake (for example, one-third of the total cost) and implementing the project.

The FDC should not be administered by a single, centralized institution based in Washington. Financing will work more effectively if the process is decentralized. The best approach entails government licensing of private venture capital outfits, public-private partnerships and other institutions with successful track records in financing companies. Winners of this competition would then be authorized to provide federally-guaranteed loans to worthy conversion projects.

Shifting this responsibility to the private sector offers many benefits. The limited availability of public funds makes it imperative that those monies are spent wisely. Washington's expertise does not extend into the realm of deciding which firms can succeed. At the same time, political factors introduce uncertainty into the appropriations process, and often result in the maintenance of projects after they have outlived their utility. Given these realities, government agencies cannot micro-manage the financing process. Such decisions are best left to private sector entities.

Models for this type of activity already exist. There are a number of venture capital firms that have taken an active role in financing conversion initiatives by small defense contractors or divisions of major contractors. These firms could serve as models for groups seeking to invest FDC funds. Since the Corporation represents a major shift in policy, the administration might first consider the FDC as a pilot project or a component of existing programs, such as those operated by the Small Business Administration. Based on the FDC's early performance, they could then revisit the program and consider its expansion.

Conclusions

Existing business conversion programs at all levels of government represent a sea change from the "hands-off" attitudes of the past. Yet, these programs offer only a partial solution at best. By neglecting a key part of the conversion puzzle -- financing -- current programs help spur commercial R&D but do not provide support for bringing these innovations to market. Without such financing in place, business conversion is doomed to failure.

Fortunately, the creation of financing mechanisms does not require massive funding or new government bureaucracies. By leveraging private funds and utilizing existing financing institutions, we can create new forms of public-private partnerships that create new jobs and new companies. Such new partnerships will allow us to turn the defense conversion challenge into an unprecedented opportunity for economic prosperity.

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